OIPE JC88
DEC 2 0 2004
PATENT & TRADEMARK OFFICE

BEST AVAILABLE COPY

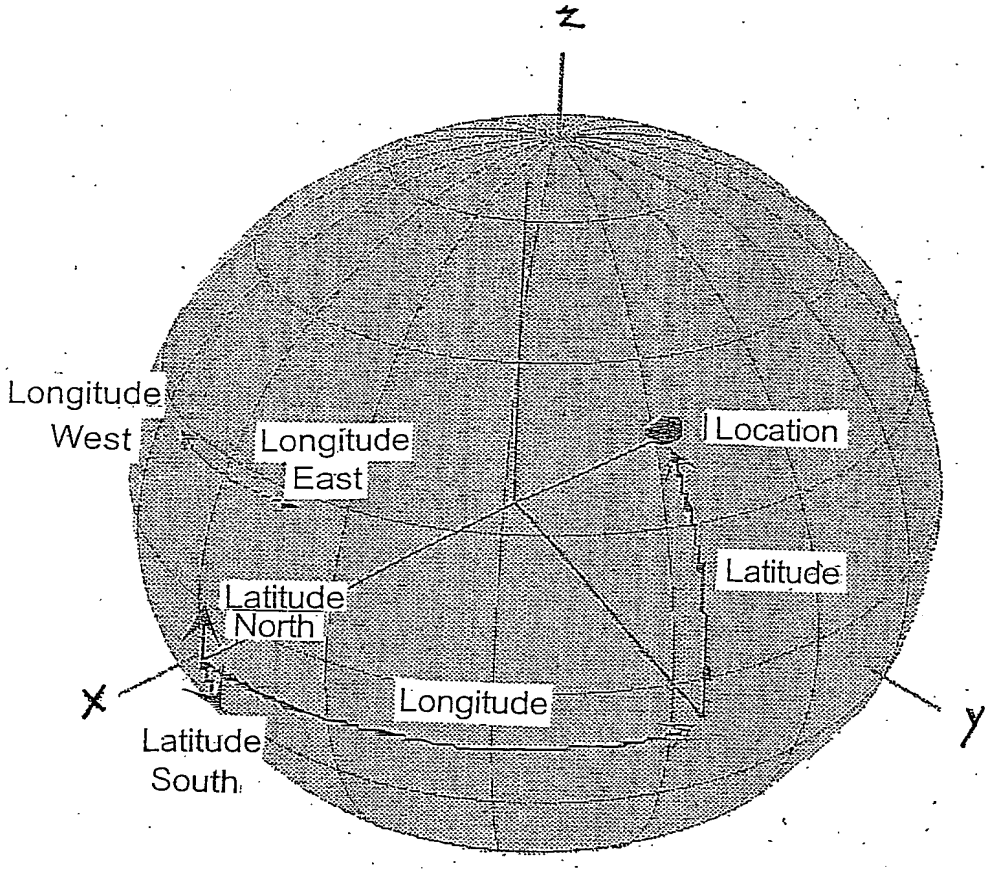

Fig. 1

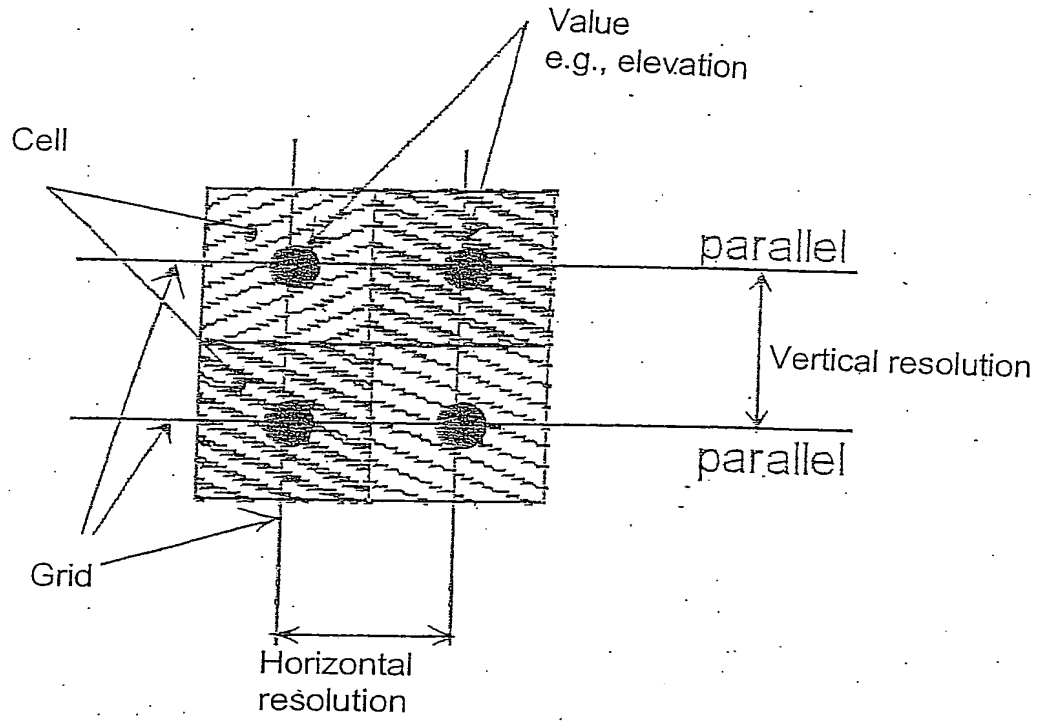
Value
e.g., elevation
Cell
parallel
Vertical resolution
parallel
Grid
Horizontal
resolution

Fig. 2

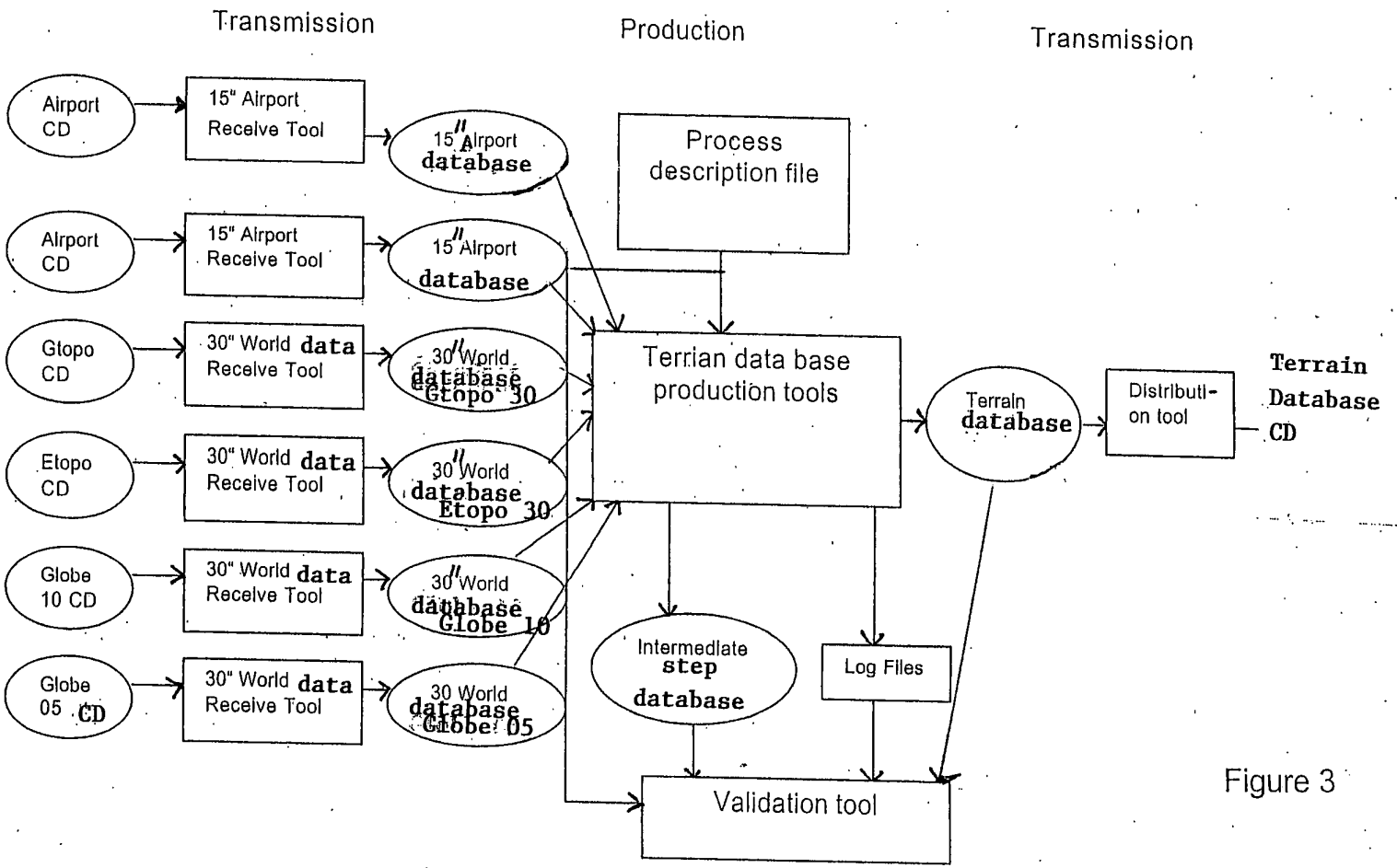
Transmission
Production
Transmission
Airport CD
15" Airport Receive Tool
15" Airport database
Airport CD
15" Airport Receive Tool
15" Airport database
Gtopo CD
30" World data Receive Tool
30" World database Gtopo 30
Etopo CD
30" World data Receive Tool
30" World database Etopo 30
Globe 10 CD
30" World data Receive Tool
30" World database Globe 10
Globe 05 CD
30" World data Receive Tool
30" World database Globe 05
Process description file
Terrian data base production tools
Intermediate step database
Log Files
Validation tool
Terrain database
Distributi-on tool
Terrain Database CD

Figure 3

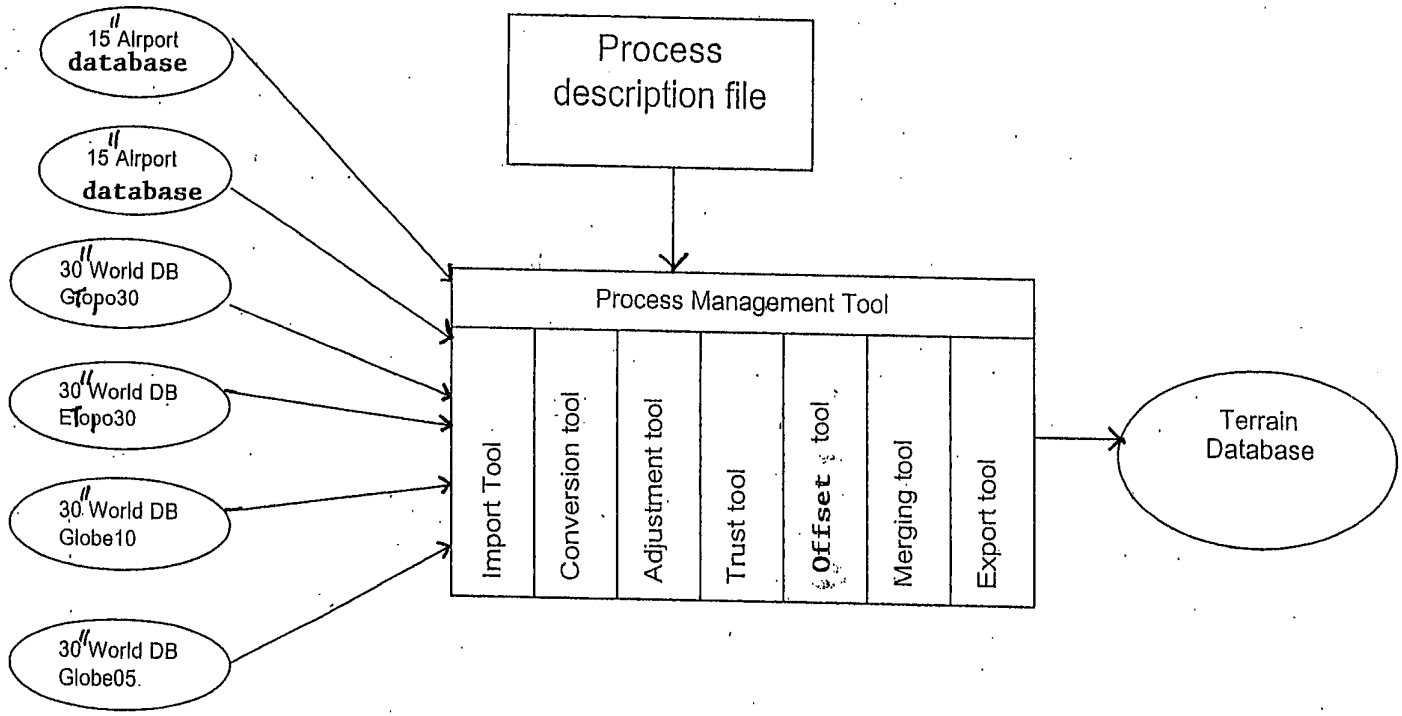
15" Airport database
15" Airport database
30" World DB Gtopo30
30" World DB Etopo30
30" World DB Globe10
30" World DB Globe05
Process description file
Process Management Tool
Import Tool
Conversion tool
Adjustment tool
Trust tool
Offset tool
Merging tool
Export tool
Terrain Database

Figure 4

Figure 5
alsProcess .log
s7_ export <Customer>
Process description file
alsProcess
Parameters
s7_export<Customer>
s56_merge
s5_offset
s4_trust
s3_adjust
s2_convert
s1_import<source>
s7_export <Customer> .log
s56_merge .log
s5_offset .log
s4_trust .log
s3_adjust .log
s2_convert .log
s1_import .log
s56_ merge
s5 _ offset
s4 _ trust
s3 _ adjust
s2 _ convert
s1 _ import
15" Airport database
15" Airport database
30" World DB Globe30
30" World DB Globe30
30" World DB Globe10
30" World DB Globe05

Tool	Purpose	Input	Output
Process Managment Tool (PMT)	executes the individual production steps	process description file	log file
Import Tool	Imports source data in a common format	Installed source data parameters by PMT	source data in AIS format, log file
Convert Tool	Converts data into common horizontal and vertical datum	Output of import tool, parameters by PMT	database with common format, log file
Adjustment Tool	Adjusts resolution of data	Output of convert tool, parameters by PMT	database with common resolution, log file
Trust Tool	Checks data and optionally modifies the reliability values	Output of adjustment tool, parameters by PMT	Database with checked and corrected reliability values, log file
Offset Tool	Adds offset to average data to simulate maximum data	Output of trust tool, parameters by PMT	Database with Maximum type, log file
Merging Tool	Merges preprocessed sources	Output of offset tool, parameters by PMT	Merged database, log file
Export Tool	Transforms database into customer's format	Output of merging tool, parameters by PMT	Database in customer's format, log file

Figure 6

```
<DEMprocess name="process_WORLD_MAX_401.xml" id="DEM_WORLD_MAX_401"
                directory="/home/dem/P2/World_30_MAX">

<sourceList>
        <source name="Etopo30" directory="/DATA/DEM/Etopo30" deviation="395"
        <source name="Gtopo30" directory="/DATA/DEM/Gtopo30" deviation="20"
        <source name="Globe10" directory="/DATA/DEM/Globe10" deviation="18"
        <source name="Globe05" directory="/DATA/DEM/Globe05" deviation="100"
        <source name="Airports" directory="/DATA/DEM/Airports" deviation="8"
</sourceList>

<coodinateList>
        <coordinate name="NW" x="-180" y="90"
        <coordinate name="SE" x=" 180" y"=-90"
</coodinateList>
```

Figure 7A1

```
<stepList>
        <step name="s1_import"/>
        <step name="s2_covert"/>
        <step name="s3_adjust"/>
        <step name="s4_trust"/>
        <step name="s5_offset"/>
        <step name="s6_merge"/>
        <step name="  aisValidate"/>
        <step name="s7_export"/>
</stepList>

<paramList>
        <param name="elevationType" value="MAX"/>
        <param name="version" value="401"/>
        <param name="resolution" value="120" >
</paramList>

</DEMprocess>
```

Figure 7A 2

```
aisProcess:
read process description file
parse process description file
for each specified step
        create step directory
        if step in (s1_import,...,s5_offset)
                for each specified source
                        call the step tool with the source
        else
                call the step tool
report success/failure to the log file
```

Figure 7B

```
<AISlog>
        <header>
                <program name= "aisProcess" version="4.12.0"/>
                <user name="dem"/>
                <start date="2002-10-31" time="15:02:45" />
        </header>

<messages>
        <arguments>
                <argument name="processDescriptionFile"
                value"process_WORLD_30_AVG_403.xml" />
        </arguments>

creating directory 's1_import". OK
executing 's1_importAirports –elevationType AVG –version 403 –resolution 120 – source Deviation 8
/DATA/DEM/Airports_IABG - o
 /RAID/home/dem/Thales/P4/DEM_WORLD_30_AVG_403/s1_import/Airports_IAGB-xNW-180
-yNW 90 –xSE 180 –ySE –90'. OK
        executing 's1_importAirports –elevationType AVG –version 403 –resolution 120 – source Deviation 8
/DATA/DEM/Airports_GEG –o
/RAID/home/dem/Thales/P4/DEM_WORLD_30_AVG_403/s1_import/Airports_GEG-xNW-180
yNW 90 –xSE 180 –ySE –90'.  OK
```

Figure 8A

executing 's7_export -elevationType AVG –version 403 – resolution 120
/RAID/home/dem/Thales/P4/DEM_WORLD_30_AVG_403/s6_merge-o
/RAID/home/dem/Thales/P4/DEM_WORLD_30_AVG_403/s7_exportThales-xNW-180-yNW90-xSE 180
–ySE –90
processDescriptionFile process_WORLD_30_AVG_403.xml. OK

</messages>

<Statistics>

<start date-"2002-10-31" time-"15:02:45 />
<end date-"2002-11-03" time-"04:51:53 />
<runtime days-"3" time-"24:00:00 />
</statistics>
</AISlog>

Figure 8B

```
<AISlog>
        <header>
                <program name="s2_convert" version="4.12.0 />
                <user name= "dem" />
                <start date="2002-10-31" time="18:33:06 />
        </header>

        <messages>
                <arguments>
                        <argument name="sourceDirectory"
value="/RAID/home/dem/Thales/P4/DEM_WORLD_30_AVG_403/s1_import/Airports_IABG"/>
        <argument name="outputDirectory"
value="/RAID/home/dem/Thales/P4/DEM_WORLD_30_AVG_403/s2_convert/Airports_IABG"/>
        <argument name="version" value="403" />
        <argument name="elevationType" value="AVERAGE" />
        <argument name="resolution" value="120" />
        <argument name="NW" value="(-180, 90)"/>
        <argument name="SE" value="(180,-90)"/>
</arguements>

ouput directory
'/RAID/home/dem/customer/P4/DEM_WORLD_30_AVG_403/s2_convert/Airports_IABG' and
subdirectories created. OK
```

Figure 9A

```
information files
/RAID/home/dem/customer/P4/DEM_WORLD_30_AVG_403/s1_import/Airport_IABG'/Airports_IABG.* read.01
        y=90 x=-180. no source segment (-180,90). Nothing done. OK
        y=90 x=-179. no source segment (-179,90). Nothing done. OK
        y=90 x=-178. no source segment (-178,90). Nothing done. OK
        y=90 x=-177. no source segment (-177,90). Nothing done. OK
        y=90 x=-176. no source segment (-176,90). Nothing done. OK
        y=90 x=-175. no source segment (-175,90). Nothing done. OK
        y=90 x=-174. no source segment (-174,90). Nothing done. OK
        y=90 x=-173. no source segment (-173,90). Nothing done. OK
        y=90 x=-172. no source segment (-172,90). Nothing done. OK
        y=90 x=-171. no source segment (-171,90). Nothing done. OK
                                    :
        y=89 x=-175. no source segment (-175,89). Nothing done. OK
        y=89 x=-176. no source segment (-176,89). Nothing done. OK
        y=89 x=-177. no source segment (-177,89). Nothing done. OK
        y=89 x=-178. no source segment (-178,89). Nothing done. OK
        y=89 x=-179. no source segment (-179,89). Nothing done. OK
        information files
/RAID/home/dem/customer/P4/DEM_WORLD_30_AVG_403/s2_convert/Globe05/Globe05.* written. OK

</messages>

<statistics>
        <start date="2002-10-31" time=22:52:50" />
        <end date="2002-10-31" time=23:33:12 />
        <runTime days = "0" time=00:40:21 />
        </statistics>
        </AISlog>
```

Figure 9B

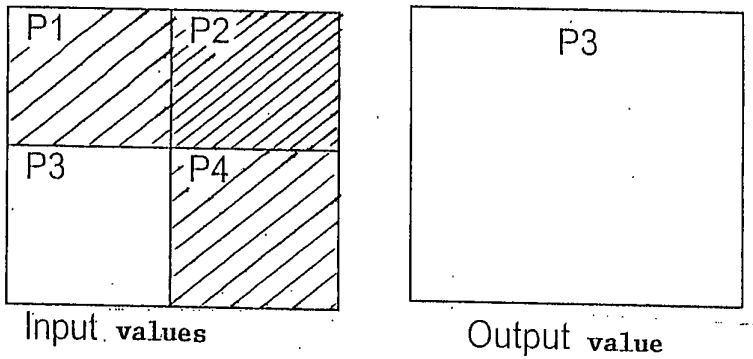

Figure 10A

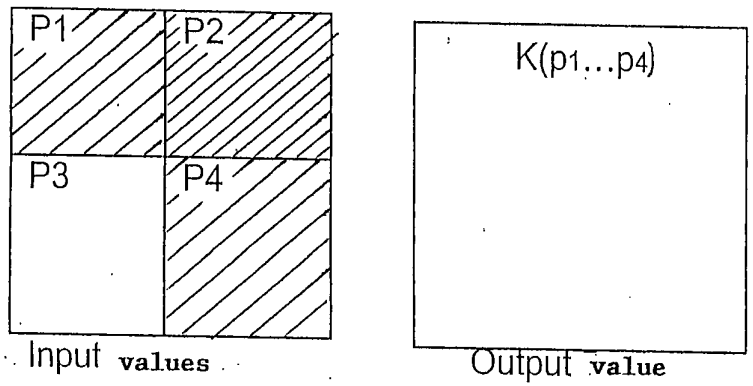

Figure 10B

S3 adjust:

Process data ():

if the input segment already has the required resolution

```
    copy the input data as output data
else
    adjust resolution
```

check if all elevation data are less than or equal MAX_ELEVATION if not, set elevation = NO_DATA and second value=NO DATA

adjust resolution ():

if current resolution is an integer multiple of required resolution then

```
    for each pair p=(elv,dev) in the output segment
        let S be the number of value pairs corresponding to p in the input segment
        if required elevation type is MAXIMUM then
            find maximum elevation elvmax in S
            set output cell to p=(elvmax,devmax)
        if required elevation type is MAXIMUM. then
            let p1...pN be the value pairs in S
            set output cell to p=K(p1...pN)
```

else

print error message and halt

Figure 11

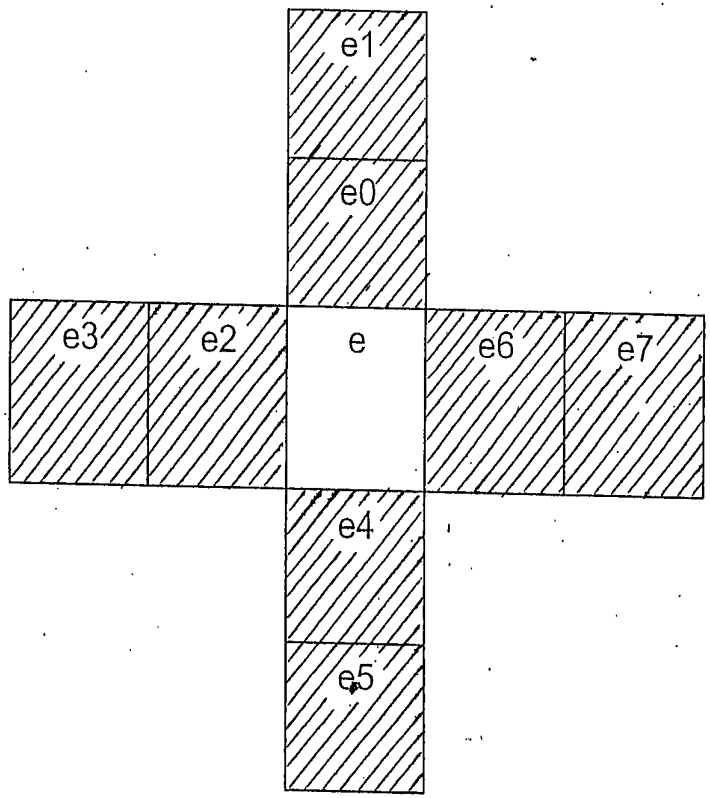

Figure 12

S4 Trust:

Process data ():

for each value pair $p=(e,d)$

let $e_0 \ldots e_7$ be the neighbors to p according to schema

let $\bar{e}$ be the average elevation of $\{e_0, e_2, e_4, e_6\}$

if $\bar{e}$ = NO_DATA then set $\bar{e} = 0$

let σ be the standard deviation of $\{e_0 \ldots e_7\}$

if σ = NO_DATA then set $\sigma = 0$

if $|e - \bar{e}| > 3\sigma$

increase standard deviation by $|e-\bar{e}|-3\sigma$

else do nothing

Figure 13

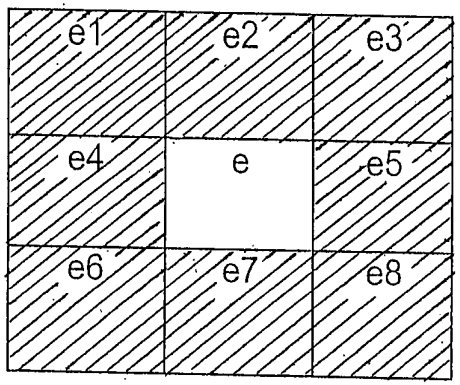

Figure 14

S5_offset:

Process _data_():
If the elevation type is already the required elevation type
    copy the input data as output data
else if the elevation data type is AVERAGE
and the required elevation type is MAXIMUM then
    for each value_pair p
        offset step (p)
else print error message and halt

offset step (p):
if p is NO DATA
    do nothing
if p is sea water
    do nothing
else
    let the value pair be p = *(e,d)*
    let $e_1 ... e_8$ be the neighboring elevation values to p
    let e_{max} be the maximum elevation of $\{e, e_1 ... e_8\}$
    if $e_{max} = e$
        let $\bar{e}$ be the average value of $\{e, e_1 ... e_8\}$
        $e_{max} = e_{max} + (e - \bar{e})$
    set the output elevation to e_{max}

Figure 15

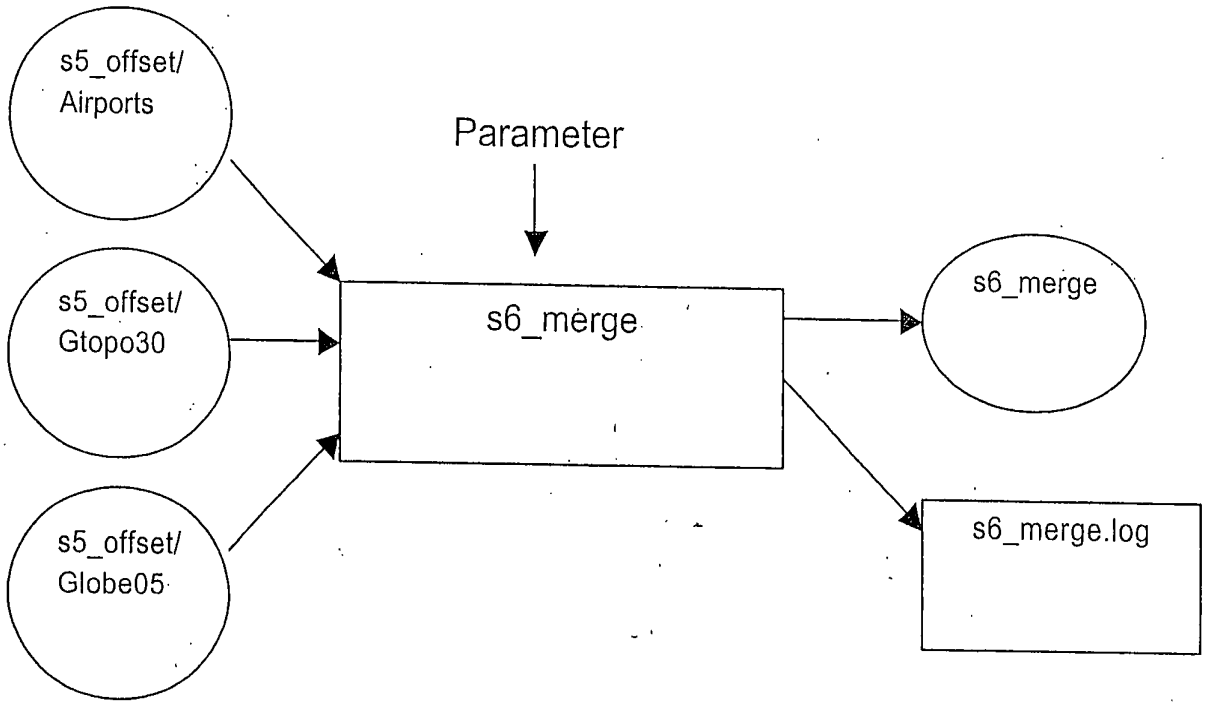
s5_offset/
Airports
s5_offset/
Gtopo30
s5_offset/
Globe05
Parameter
s6_merge
s6_merge
s6_merge.log

Figure 16A

	ND	T	W
ND	ND	T	W
T	T	T=k(T,T)	T
W	W	T	W=k(W,W)

Figure 16B

	ND	T	SW	BW
ND	ND	T	SW	BW
T	T	T=k(T,T)	T	BW→T T=k(T,T) T→ BW
SW	SW	T	SW=k(SW,SW)	BW
BW	BW	BW→T T=k(T,T) T→BW	BW	BW=k(BW,BW)

Figure 16C

S6_merge:

process data ():
for each value pair
    let *N* be the number of source data

```
let pi be the value pair of source i, for i=1...N
```

    output value pair p = *K* (p_1...p_N)

Figure 17

s7_export

```
create output directory outdir with all sub-directories
create two temporary directories: temp_elv, temp_qty
for each 5°x5° area
   for each file in this area
      read the elevation file
      read the deviation file
      write the elevation file to temp_elv in      elv file format
      write the deviation file to temp_qty in      qty file format
      for each cell in the deviation file
         if deviation > 20 then add cell to file DEFECTIVE_CELLS
      if there is at least one defective cell in the segment
         then add segment to DEFECTIVE_SEGMENTS
   tar and gzip temp_elv and write it to outdir/area/
   tar and gzip temp_qty and write it to outdir/area/
   write the .sea file to outdir/area/
   write MP5 checksum to outdir/area/
write .sea, .ter, .nod to outdir
copy process description file to outdir
copy log files to outdir
remove temporary directories
create TDBCI to DOC directory
create TDBPL to DOC directory
copy TDBTCI to DOC directory
create README file
create VERSION file containing the database ID
```

Fig. 18

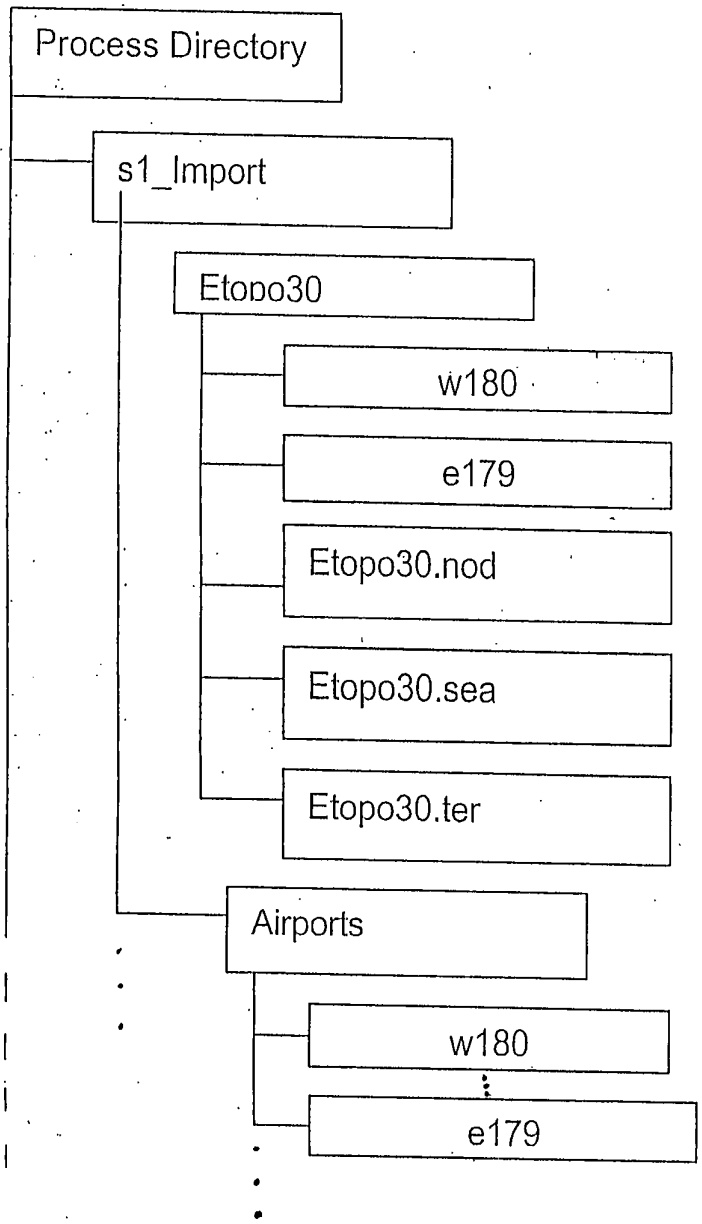
Process Directory
s1_Import
Etopo30
w180
e179
Etopo30.nod
Etopo30.sea
Etopo30.ter
Airports
w180
e179

Figure 19 A

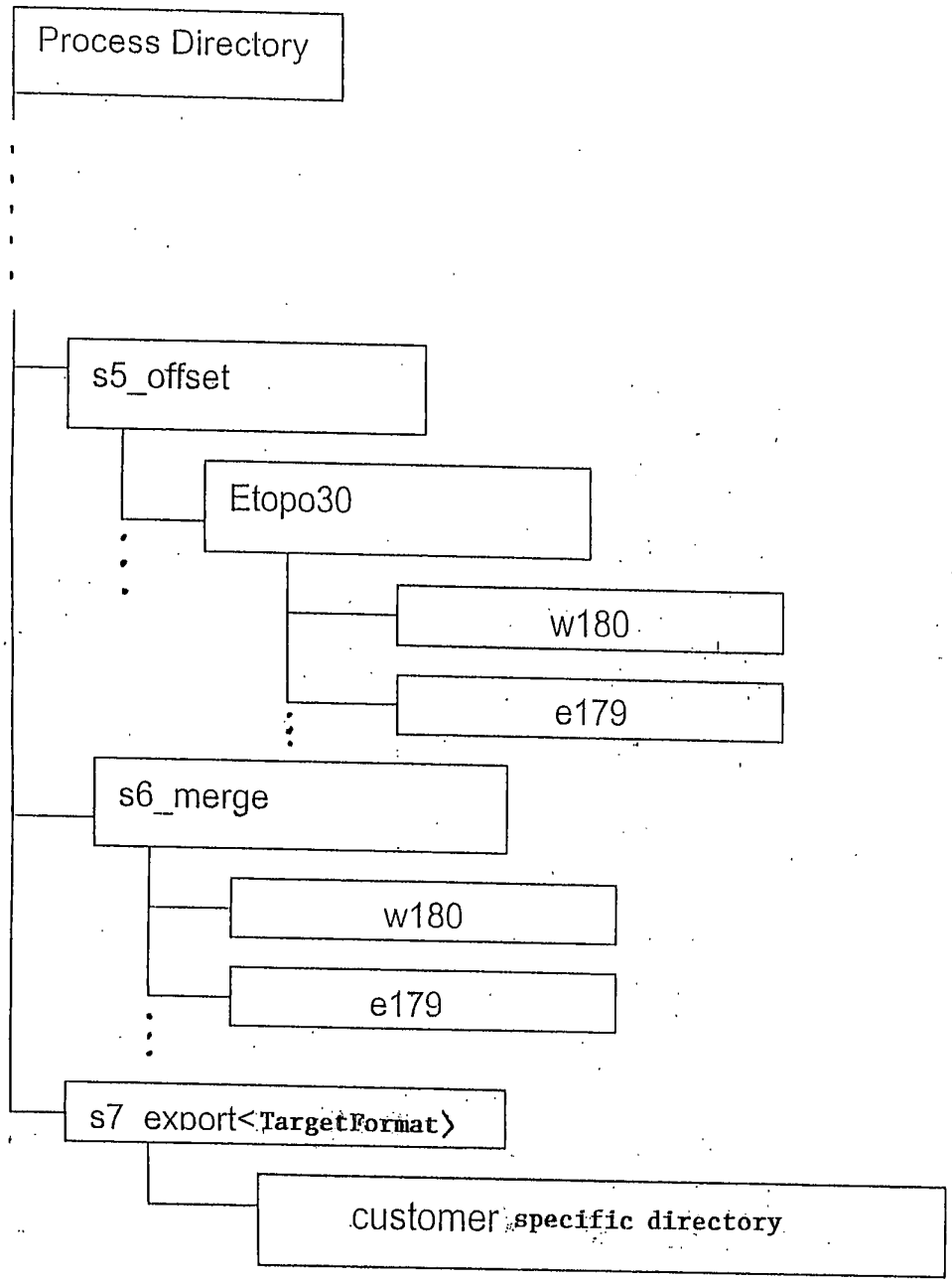
Process Directory
s5_offset
Etopo30
w180
e179
s6_merge
w180
e179
s7_export<TargetFormat>
customer specific directory

Figure 19B

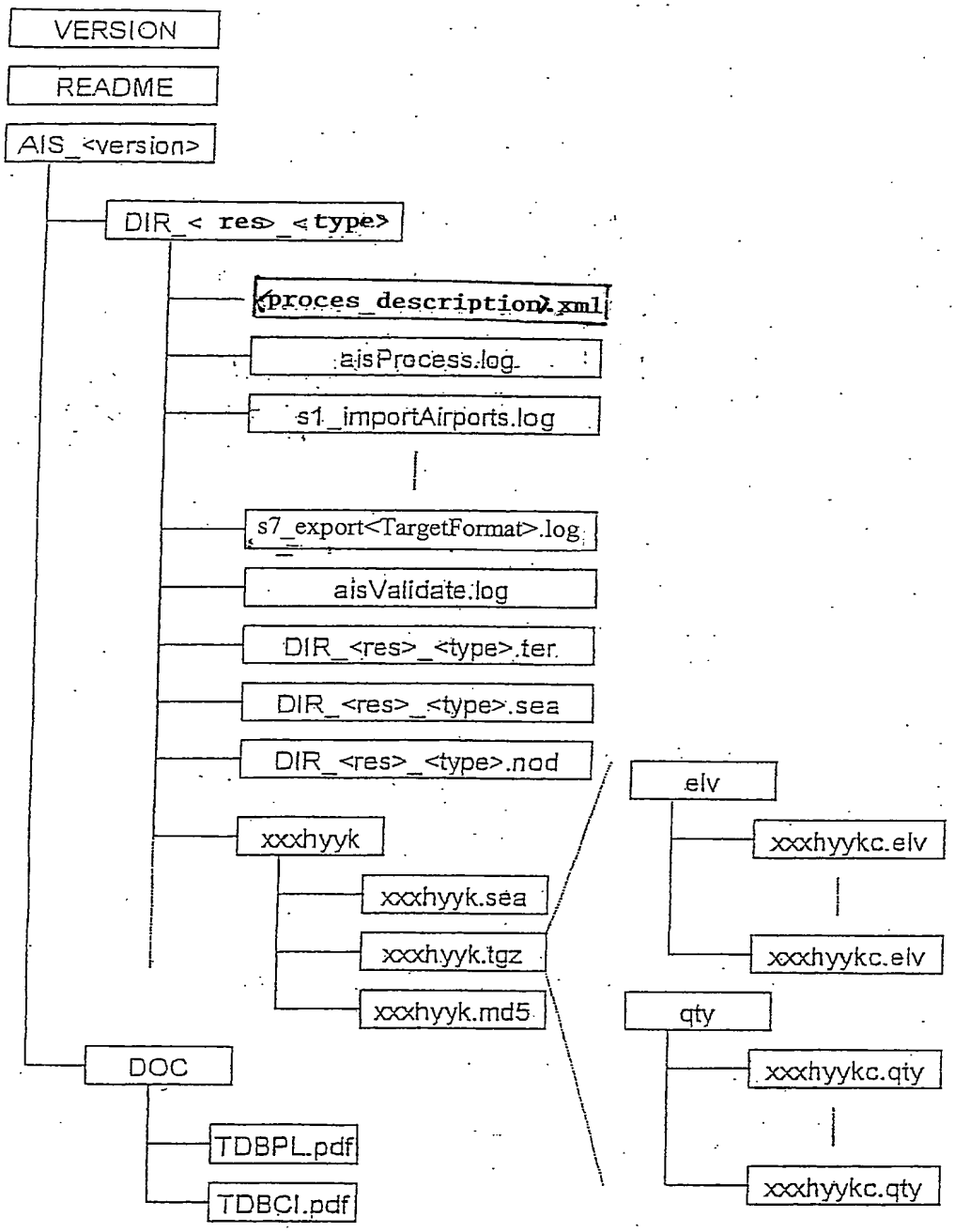
VERSION
README
AIS_<version>
DIR_<res>_<type>
proces_description.xml
aisProcess.log
s1_importAirports.log
s7_export<TargetFormat>.log
aisValidate.log
DIR_<res>_<type>.ter
DIR_<res>_<type>.sea
DIR_<res>_<type>.nod
xxxhyyk
xxxhyyk.sea
xxxhyyk.tgz
xxxhyyk.md5
elv
xxxhyykc.elv
xxxhyykc.elv
qty
xxxhyykc.qty
xxxhyykc.qty
DOC
TDBPL.pdf
TDBCI.pdf

Fig. 20

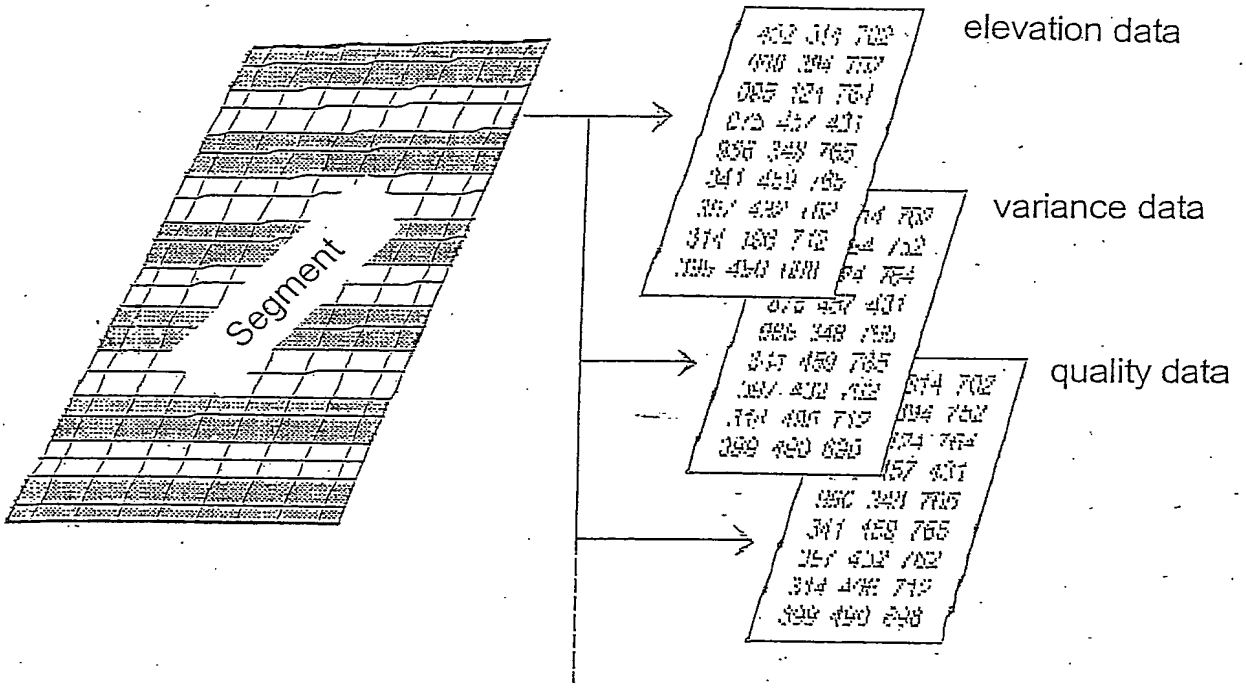

Fig. 21

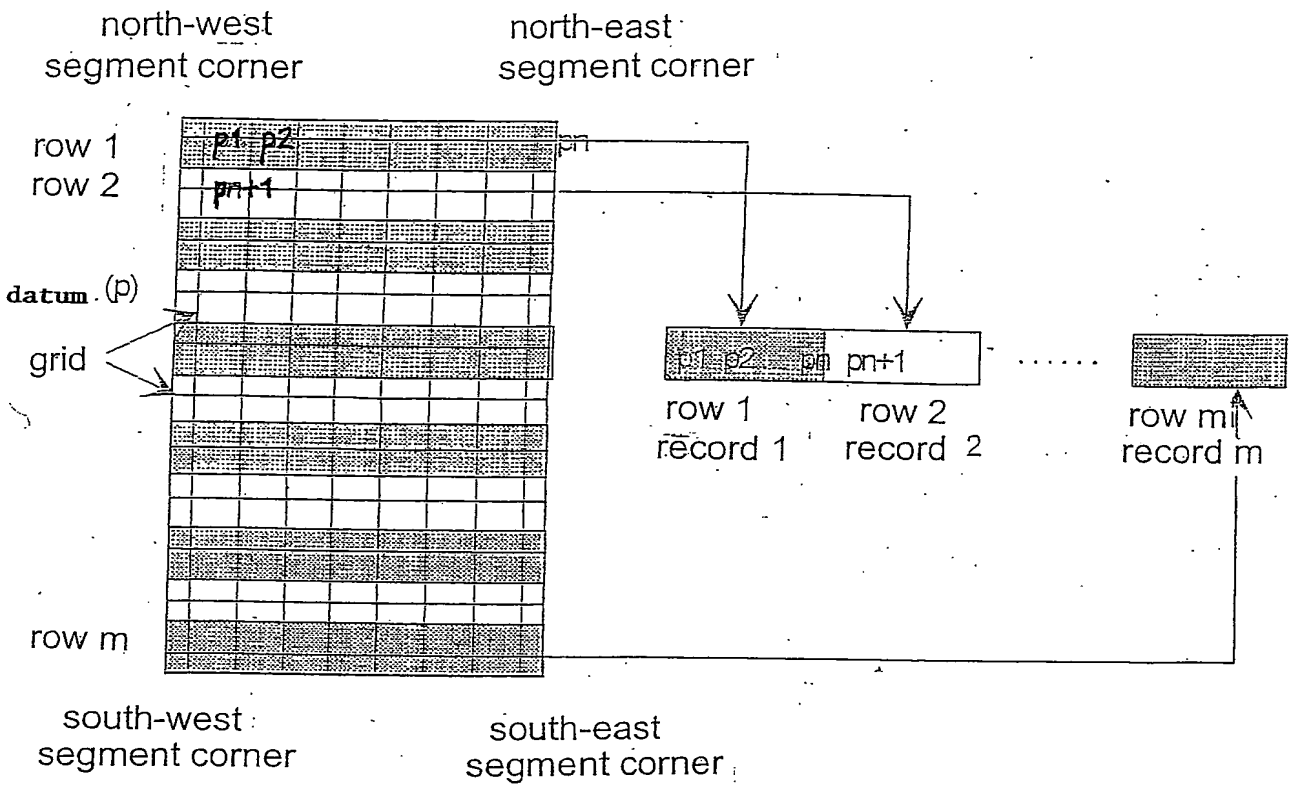
north-west
segment corner
north-east
segment corner
row 1
row 2
p1 p2
pn
pn+1
datum (p)
grid
p1 p2 pn pn+1
row 1
record 1
row 2
record 2
row m
record m
row m
south-west
segment corner
south-east
segment corner

Fig. 22

```
//world_30_max.ter
//Terrain segment overview file
//10.10.2002
// (C) AIS Advanced Infodata Systems GmbH
1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 1 1 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0 0   . . .
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0 0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 0 0 0 0
1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
                .
                .
                .
```

Figure 23

Figure 24

Delete the Ref. Column

Byte Location	Decription	Size (Bytes)
0	Data type identifier	2
2	Byte order	2
4	Byte order check value	2
6	Version code	4
10	Creation date	4
14	Segment name	14
28	Horizontal reference value	2
30	Vertical reference value	2
32	Longitude of the NW corner	4
36	Latitude of the NW corner	4
40	Longitude of the NE corner	4
44	Latitude of the NE corner	4
48	Longitude of the SW corner	4
52	Latitude of the SW corner	4
56	Longitude of the SE corner	4
60	Latitude of the SE corner	4
64	Horizontal segment size	4
68	Vertical segment size	4
72	Horizontal resolution	4
76	Vertical resolution	4
80	Longitude of first value	4
84	Latitude of first value	4
88	Number of columns	4
92	Number of rows	4
96	Content identifier 1	2
98	Content identifier 2	2
100	Content identifier 3	2
102	Content identifier 4	2
104	Content identifier 5	2
106	Content identifier 6	2
108	Content identifier 7	2
110	Content identifier 8	2
112	Content identifier 9	2
114	Content identifier 10	2

Location	Description	Number of Bytes
0	Version code	4
4	Creation date	4
8	Elevation scale	2
10	elevation data type	2
12	number of bytes per data value	2
14	minimum data value per segment	2
16	maximum data value per segment	2
18	Identifier for no data values	2

Figure 25A

Location	Description	Number of Bytes
0	Index	4
4	Minimum value of the record	2
6	Maximum value of the record	2
8	Longitude of the first value	4
12	Latitude of the first vale	4
16	First value of the record	2
18	Second value of the record	2
...	...	2
...	Last value of the record	2

Figure 25B

Location	Description	Number of Bytes
0	Version Code	4
4	Creation date	4
8	Accuracy scale	2
10	Number of quality description definitions	2
12	Number of bytes per quality identifier	2
14	Minimum quality identifier of the segment	2
16	Maximum quality identifier of the segment	2
18	Identifier for no data values	2

Figure 26A

Location	Description	Number of Bytes
0	Identifier of the quality description definition	2
2	Absolute horizontal accuracy – sigma 1	4
6	Relative horizontal accuracy – sigma 1	4
10	Absolute vertical accuracy – sigma 1	4
14	Relative vertical accuracy – sigma 1	4
18	Absolute horizontal accuracy – sigma 2	4
22	Relative horizontal accuracy – sigma 2	4
26	Absolute vertical accuracy – sigma 2	4
30	Relative vertical accuracy – sigma 2	4
34	Absolute horizontal accuracy – sigma 3	4
38	Relative horizontal accuracy – sigma 3	4
42	Absolute vertical accuracy – sigma 3	4
46	Relative vertical accuracy – sigma 3	4

Figure 26B

Location	Description	Number of Bytes
0	Index	4
4	Minimum quality value of the record	2
6	Maximum quality value of the record	2
8	Logitude of first value	4
12	Latitude of first value	4
16	First quality value of the record	2
18	Second quality value of the record	2
...	...	2
...	Last Quality value of the record	2

Figure 26C

Figure 27A Data Type Identifier

Type	Integer
Size (Bytes)	2
Description	The identifier identifies the file type. Supported types of files are: 1 = Elevation data 2 = Variance data 3 = Quality data 4 = Reliability data

Figure 27B Byte Order

Type	Integer
Size (Bytes)	2
Description	The value identifies the byte order used: 0 = unknown (not used in the AIS databases) 1 = LSB, little endian (e.g.. PC's, DEC Alpha) 2 = MSB,big endian (e.g. Sun SPARC, SGI)

Figure 27C Byte order check value

Type	Integer
Size (Bytes)	2
Description	The check value is a value that allows determination of the byte order. The value is always set to the integer 24575.

Figure 27D Version Code

Type	Integer
Size (Bytes)	4
Description	The version code contains a value that represents the database version.
Example	300 (for database with ID DEM_WORLD_30_MAX_300)

Figure 27E Creation Date

Type	Integer
Size (Bytes)	4
Description	The creation date contains the date on which the file was created or revised. The format is day, month, year: DDMMYY.
Example	250969 stands for June 25, 1996

Figure 27F Segment Name

Type	Integer
Size (Bytes)	14
Description	The string that contains the segment name is always 14 characters long and formatted left-justified, whereby blank spaces are used for nonexistent characters. The string does not contain a final "0".
Example	"011E48NS " "00660E288ONS"

Figure 27G Location Reference

Type	Integer
Size (Bytes)	2
Description	The location reference designates the ellipsoid used. Supported ellipsoids are: LR = 1:WGS-84 Ellipsoid

Figure 27H Elevation Reference

Type	Integer
Size (Bytes)	2
Description	The elevation reference designates the zero level for the indicated elevation values. Supported formats are: ER = 1: WGS-84 ER = 2: Mean Sea Level

Figure 27I Longitude of Corner

Type	Integer
Size (Bytes)	4
Description	These values indicate the position of the segment. It *[sic]* stands for the longitude of one corner in arc-seconds. Positive values indicate east, negative values indicate west.
Example	39600 (equal to 11° East) -39600 (equal to 11° West)

Figure 27K **Latitude of Corner**

Type	Integer
Size (Bytes)	4
Description	These values indicate the position of the segment. It *[sic]* stands for the latitude of one corner in arc-seconds. Positive values indicate north, negative values indicate south.
Example	172800 (equal to 48 ° North) -172800 (equal to 48 ° South)

Figure 27L Longitudinal Segment Size

Type	Integer
Size (Bytes)	4
Description	This value indicates the size of the segment in the east-west direction in arc-seconds. It must be equal to the difference between the longitudes of the NW and NE corner **or** the SW and SE corner**, respectively.**
Example	10800 (equal to a segment 3° x 3° in size)

Figure 27M Latitudinal Segment Size

Type	Integer
Size (Bytes)	4
Description	This value indicates the size of the segment in the north-south direction in arc-seconds. It must be equal to the difference between the latitudes of the NW and SW corner **or** the NE and SE corner**, respectively.**
Example	10800 (equal to a segment 3° x 3° in size)

Figure 27N Longitudinal Resolution

Type	Integer
Size (Bytes)	4
Description	This value describes the resolution, i.e., the distance between two values, in the west-east direction in 1/100 arc-seconds.
Example	1500 (15 arc-seconds resolution)

Figure 270 Latitudinal Resolution

Type	Integer
Size (Bytes)	4
Description	This value describes the resolution, i.e., the distance between two values, in the north-south direction in 1/100 arc-seconds.
Example	1500 (15 arc-seconds resolution)

Figure 27P Longitude of the First Value

Type	Integer
Size (Bytes)	4
Description	This value describes the longitude of the center of the first cell in 1/100 arc-seconds.
Example	3960750 (western boundary of the segment 11° east. resolution 15.0 arc-seconds) -3960750 (western boundary of the segment 11° west. resolution 15.0 arc-seconds)

Figure 27Q Latitude of the First Value

Type	Integer
Size (Bytes)	4
Description	This value describes the latitude of the center of the first cell in 1/100 arc-seconds.
Example	17279250 (northern boundary of the segment 48° north. resolution 15.0 arc-seconds) -17279250 (northern boundary of the segment 48° south. resolution 15.0 arc-seconds)

Figure 27R Number of Columns

Type	Integer
Size (Bytes)	4
Description	This value describes the number of columns of the segment.
Example	120 (1° segment, resolution 30")

Figure 27S Number of rows

Type	Integer
Size (Bytes)	4
Description	This value describes the number of rows of the segment.
Example	120 (1° segment, resolution 30")

Figure 27T Content Identifier

Type	Integer
Size (Bytes)	2
Description	This value indicates which information are available for the segment. A value of 0 indicates that no additional information is available, a value of 1 means that the information in question is available. The following additional types of information are supported: Content Identifier 1:(Always 1) Content Identifier 2: Variance data Content Identifier 3: quality data Content Identifier 4: trust value Content Identifier 5: Reserved for future use Content Identifier 6: Reserved for future use Content Identifier 7: Reserved for future use Content Identifier 8: Reserved for future use Content Identifier 9: Reserved for future use Content Identifier 10: Reserved for future use
Example	IB1 = 1; IB2 = 0; IB3 = 1; IB4 = 0 indicates a segment which contains elevation and quality data.

Figure 27U Data Scale

Type	Integer
Size (Bytes)	4
Description	This value indicates the scale of the data. 1 = Meters 2 = Centimeters
Example	

Figure 27V **Elevation type**

Type	Integer
Size (Bytes)	2
Description	The elevation type defines the type of elevation value given: ET = 0: Unknown elevation type ET = 1: An elevation value corresponds to the minimum elevation within the represented area ET = 2: An elevation value corresponds to the maximum elevation within the represented area ET = 3: An elevation value corresponds to the average elevation within the represented area ET = 4: An elevation value corresponds to the weighted average elevation within the represented area

Figure 27W Bytes per value

Type	Integer
Size (Bytes)	2
Description	This entry indicates the number of bytes in which each value of the data record is encoded.
Example	2 (2 bytes are used for each value)

Figure 27X Minimum Value in the Segment

Type	Integer
Size (Bytes)	See "Bytes per Value"
Description	The value indicates the minimum value of the segment.

Figure 27Y Maximum Value in the Segment

Type	Integer
Size (Bytes)	See "Bytes per Value"
Description	The value indicates the maximum value of the segment.

Figure 27Z No data value

Type	Integer
Size (Bytes)	See "Bytes per Value"
Description	The entry indicates the value that is being used to identify the nonexistence of a value.
Example	-9999 is a typical NO_DATA value for two byte elevation data

Figure 27AA Entry Counter

Type	Integer
Size (Bytes)	4
Description	The counter serves as an index of the data record rows. The counter begins with 0 for the first row and ends with the total number of rows minus 1.

Figure 27AB Minimum Value in the Data Record

Type	Integer
Size (Bytes)	See "Bytes per Value"
Description	The value indicates the minimum value of the data record. NO_DATA entries are ignored, unless all of the values are NO_DATA, in which case the value is also set to NO_DATA.

Figure 27AC Maximum Value in the Data Record

Type	Integer
Size (Bytes)	See "Bytes per Value"
Description	The value indicates the maximum value of the data record. NO_DATA entries are ignored, unless all of the values are NO_DATA, in which case the value is also set to NO_DATA.

Figure 27AD Longitude of the First Data Record Entry

Type	Integer
Size (Bytes)	4
Description	The value describes the longitude of the center of the first cell in the current data record in 1/100 arc-seconds.
Example	3960750 (western boundary of the segment 11° east. resolution 15.0 arc-seconds) -3960750 (western boundary of the segment 11° west. resolution 15.0 arc-seconds)

Figure 27AE Latitude of the First Data Record Entry

Type	Integer
Size (Bytes)	4
Description	The value describes the latitude of the center of the first cell in the current data record in 1/100 arc-seconds.
Example	17279250 (northern boundary of the segment 48° north. resolution 15.0 arc-seconds) -17279250 (northern boundary of the segment 48° south. resolution 15.0 arc-seconds)

Figure 27AF Elevation Value

Type	Integer
Size (Bytes)	See "Bytes per Value"
Description	The elevation value contains the elevation of the corresponding area, or the NO_DATA identifier if no value is present.

Figure 27AG Number of Quality Descriptions

Type	Integer
Size (Bytes)	2
Description	The value indicates how many quality descriptions are present.

Figure 27AH Quality Description Identifier

Type	Integer
Size (Bytes)	See "Bytes per Value"
Description	The identifier defines the index for a quality description. The index is used in the quality entries to point to a quality description that finally contains the actual quality for the data record. The identifier is a number between 0 and the number of quality descriptions –1.

Figure 27AI Absolute Horizontal Accuracy

Type	Integer
Size (Bytes)	4
Description	The absolute horizontal accuracy indicates the position error of the individual cells, or the NO_DATA identifier if the position error is unknown. The following confidence levels are supported: Sigma 1 = 68.26% confidence level Sigma 2 = 95.44% confidence level Sigma 3 = 99.73% confidence level

Figure 27AK Relative Horizontal Accuracy

Type	Integer
Size (Bytes)	4
Description	The relative horizontal accuracy indicates the position error between two neighboring cells, or the NO_DATA identifier `if` the position error is unknown. The following confidence levels are supported: Sigma 1 = 68.26% confidence level Sigma 2 = 95.44% confidence level Sigma 3 = 99.73% confidence level

Figure 27AL Absolute vertical accuracy

Type	Integer
Size (Bytes)	4
Description	The absolute vertical accuracy indicates the absolute measurement error of the elevation values, or the NO_DATA identifier `if` the measurement error is unknown. The following confidence levels are supported: Sigma 1 = 68.26% confidence level Sigma 2 = 95.44% confidence level Sigma 3 = 99.73% confidence level

Figure 27AM Relative vertical accuracy

Type	Integer
Size (Bytes)	4
Description	The relative vertical accuracy indicates the error between two neighboring elevation values, or the NO_DATA identifier `if` the measurement error is unknown. The following confidence levels are supported: Sigma 1 = 68.26% confidence level Sigma 2 = 95.44% confidence level Sigma 3 = 99.73% confidence level

This Page is Inserted by IFW Indexing and Scanning Operations and is not part of the Official Record

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☑ BLACK BORDERS
- ☐ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☐ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☐ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.
As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.